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ABSTRACT

This paper investigates the elementary school principal's role in helping to sustain implementation of a complex math and science program designed to foster the development of higher order thinking skills, particularly for language minority students. The study predicted a positive relationship between coordination and program continuation; if the principal organized conditions enabling teachers to implement a new and complex program, then the quality of what occurred in the classroom would be maintained over time. The innovation studied is a math and science curriculum called Finding Out/Descubrimiento (FO/D), boasting 17 physics and chemistry themes and 130 associated activities. The study was conducted in eight school districts of varying sizes in the San Francisco Bay Area (California). Data were collected using one classroom observation instrument and two questionnaires for principals and teachers, respectively. Findings showed little association between administrative coordination and the quality of program continuation after the first implementation year. One explanation could be the teachers' strong understanding of the program and delegation of authority, which might require less principal involvement. Also, teachers might require a different type of administrator support in subsequent years. Eight tables are appended. (18 references) (MLH)

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ORGANIZATIONAL FACTORS AFFECTING THE CONTINUATION OF AN INSTRUCTIONAL INNOVATION FOR HETEROGENEOUS POPULATIONS

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ORGANIZATIONAL FACTORS AFFECTING THE CONTINUATION OF AN INSTRUCTIONAL INNOVATION FOR HETEROGENEOUS POPULATIONS

Introduction

The lack of achievement of language minority students in math and science has been well documented in the literature. This pattern of underachievement can be observed in the early elementary school grades and continues to be observed throughout high school. This is particularly true for students from lower socioeconomic populations who also have limited proficiency in the English language (Cohen, no date). A report by the U. S. Department of Education (1981) cited that relatively low proportions of Black, Hispanic, and American Indian high schools seniors complete advanced math and science courses. For example, a little more than one third of Black and Hispanic high school seniors complete advanced algebra courses. Twenty-five percent of Black and Hispanic students complete chemistry courses and less than a fifth complete physics courses. The proportion of Blacks and Hispanics who finished trigonometry courses (15%) was the smallest in the population of high school seniors.

If this pattern of underachievement is to change, it is in the early primary grades that corrective measures must be taken. If students can be brought up to grade level in reading, science, and math during these early grades, and if they are exposed to instructional programs designed to stimulate and develop their scientific curiosity, their powers of observation, analysis, conceptualization, and generalization, then they will be prepared to take advantage of the coursework in science and math that currently is more readily accessible to other population groups.

This paper investigates the role of the elementary school principal in helping to sustain over time, the implementation of a complex math and science program that is designed to foster the development of higher-order thinking skills, particularly for language minority students. Other research (Berman and McLaughlin, 1977) has found that the principal's role is a key factor in program continuation, irrespective of the type of program being used. This finding was of particular interest to this study because a central premise here is that a complex technology - or program - puts different demands on the organization (and specifically, the principal) than a less complex technology. In the following section, complex technology is described.

Complex Technology

In organizational sociology, technology refers to the "set of materials, procedures, and knowledge by which an organization attempts to carry on its work" (Hickson, Pugh, and Pheysey, 1969). Scott (1981) adds that technology also includes "...the skills and knowledge of workers, even the characteristics of the objects on which the work is performed" (p. 208). When this definition of technology is applied to instruction, Cohen, Deal, Meyer, and Scott (1979) describe technology in the classroom as follows:

> ...technology is the set of materials, procedures, and activities through which the organization tries to accomplish its central purpose. In school classrooms the technology is the curriculum, instructional methods, teaching techniques, and materials - all of which are aimed at producing cognitive or affective change in students. (p.7)

There are three ways that technology can vary from simple to complex. Technology is considered to be complex when: 1) there is a high level of differentiation in groupings of workers and materials (for example, many learning centers with a different task at each learning center); 2) when there are many exceptions encountered that the organizational actor (teacher and/or student) must process; and 3) by the extent of non-routine decision-making required of the actor (teacher and/or student). In this instance, with many student groups, materials, and exceptions, there are few routines or traditions dictating how things should be done. The innovation used in this study, Finding Out/Descubrimiento (FO/D), is complex in these three ways.

By contrast, a simple technology would be the traditional whole class instructional method in which there was: 1) a low level of differentiation in groupings of workers and materials, because all students would be in one large group working on the same task; 2) few exceptions, again because all students were working on the same task; and 3) routine decision-making as a result of few exceptions.

The Innovation

The innovation examined in this study is a math and science curriculum called Finding Out/Descubrimiento (De Avila and Duncan, 1982). The goal of this innovative curriculum is to foster the development of higher order thinking skills in elementary school children. The Finding Out/Descubrimiento (FO/D) curriculum has seventeen physics and chemistry themes and 130 activities grouped around these themes. Task cards and worksheets are written in Spanish, English, and pictographs and present students with open-ended tasks

that are purposely ambiguous and require the use of problem-solving skills.

Students work in small groups (called learning centers) of three to five students, and use manipulative materials designed to help them understand abstract scientific concepts by hypothesizing, estimating, experimenting, analyzing, and working together. This curriculum is designed primarily for students in the second through fifth grades and is effective particularly with heterogeneous populations where the teacher works with students who have a wide range of academic and linguistic skills and cultural backgrounds.

What does FO/D look like in a typical classroom? Imagine a classroom in which five or six learning centers are operating simultaneously, usually with three to five students at each center. Each group of students has a different experiment on which to work and which requires a variety of manipulative materials. The students have been instructed on how to work together cooperatively in order to complete the open-ended tasks.

One of the teacher's jobs is to help promote student interaction so that the students talk and work together as much as possible during the discovery phase of the activities. This means there is much discussion among the students and the noise level is higher in this classroom than in the traditionally structured classroom. The teacher asks questions designed to stimulate students' thinking but must do so in a way that does not disrupt the students' process of discovery. Because each group of students is working on a different task, albeit related to the same concepts of physics and chemistry, the teacher cannot predict what questions the students will ask her or what they will discover among themselves. This situation presents more uncertainty for the teacher than she would encounter in a more conventionally structured classroom.

Theoretical Framework

Organizational theories of technology and structure have been used to examine and explain many facets of schools. In this study, it is argued that given a technologically complex program, the demands for coordination by the principal are greater than with a simple program. This argument is supported by the Rational Model of organizations, which is described below.

Rational Model

This perspective of organizations traditionally has been used to analyze schools. This model states that organizations are instruments designed to attain specified goals (Scott, 1981) and emphasizes the importance of coordination and control of the technical core as critical ingredients for organizational effectiveness (Thompson, 1967). Meyer et al., (1980) claim that "Much attention is devoted to the rational organization of the work processes within the organization: developing an appropriate division of labor, specifying work procedures, and managing the resulting interdependence" (p. 5). In these types of organizations, the formally prescribed rules, roles, and relationships result in coordination and control behaviors which have the net effect of increasing the efficiency and productivity of the organization so it will prosper in relation to its environment (Cohen and Miller, 1980).

Coordination is of particular interest in this study and refers to the managing of interdependence of organizational parts. Complex technology pushes an organization toward interdependent work arrangements (Perrow, 1967), and organizations with interdependent workers have an increased need for coordination (Thompson, 1967). The program which is the subject of this study mandates coordination at the school level in the first year of implementation.

This mandate pushes the school toward increased staff interdependence and the need for increased coordination at the school level by the principal. Although the technological complexity occurs in the classroom, it imposes certain requirements on the principal (Dahl, forthcoming).

In this study, coordination refers to bringing something into common action and is defined as "activities by the principal designed to ensure that: 1) teachers have the time to work together with relevant personnel as directed by the program; and 2) resources of time, space, and materials are shared in a way that facilitates program implementation" (Dahl, forthcoming, p. 59).

> Coordination occurs when the needs of all the other teachers in a school must be taken into consideration and arrangements must be made so that several needs are met simultaneously. This need for coordination would be especially necessary when there is mutual dependence on a limited resource. (Dahl, forthcoming, p. 58-9)

Institutional Theory

Counter to arguments from rational theory, Meyer and Rowan (1977) claim that close coordination and control of day-to-day activities is incompatible with their analysis of schools as organizations. Increasingly, Meyer and Rowan's description of schools as institutions that exist in highly institutionalized environments, is being accepted as viable. Meyer and Rowan (1977) claim that organizations such as schools arise in environments that are highly institutionalized and they are dependent on their environments for acceptable accounts to legitimize their activities. They claim that close coordination and

control of day-to-day activities is incompatible with an organization's attempts to conform to the requirements of the wider environment, particularly when there is an absence of what they claim is a clearly understood and efficacious technical process (instruction) for obtaining desired outcomes. Such control and coordination reveals inconsistencies and conflicts among institutional rules, raises questions about the effectiveness of programs, exposes vague and vacuous goals and procedures, and makes explicit the difficulties and problems of implementation.

Cohen and Miller (1980) argue that under conditions of technological complexity, failure to coordinate and control instruction will result in decreased performance standards and an ineffective organization. Findings from their study support their claim that if schools fail to respond to increased interdependence and task uncertainty like rational (technical) organizations by using coordination strategies, the participants will view the organization as ineffective.

If organizational managers rarely manage, inspect, or implement instructional matters as Meyer and Rowan (1977) claim, this work is left to individual actors to deal with informally. If the demands for coordination are not met, the chances for program survival are minimized. Without proper coordination at the school level, the requirements for managing both the interdependence among workers and the necessary resources mandated by the program are difficult to meet. It is predicted that a technologically complex instructional program will not survive unless there is some attempt by the organization to coordinate at the school level, the time, space, and resource needs of program personnel, which are brought on by increased interdependence.

Hypotheses

Based on the preceding theoretical discussion, the following theoretical proposition and its hypotheses are tested:

Proposition

> Given a complex technology which mandates coordination and control, coordination will be related positively to continuation of the technology.

Hypothesis 1

> Given a complex instructional program which mandates coordination and control in the first year, the extent of coordination by the principal beyond the first year will be related to the quality of implementation at that time.

Hypothesis 2

> Given a complex instructional program which mandates coordination and control in the first year, the extent of coordination by the principal beyond the first year will be related to the extent of continuation of the program.

The Setting and Sample

The study was conducted in eight school districts of varying sizes in the greater San Francisco Bay area. Seven districts were urban, one was rural. Twenty-six schools were involved in the study and all but two schools were urban. A large number of students were classified as "language minority" and came from low-income families. Based on data collected from the schools, there was an average of 45 percent Hispanic students, and an average of ten percent of the students from Asian and South Pacific Island descent.

The sample of 51 teachers came from a population of 61 teachers who voluntarily participated in a two-week training to learn how to use the Finding

Out/Descubrimiento (FO/D) program, from 1982-85. Ten teachers could not be located. The teachers in the sample met two criteria: first, they were trained at Stanford University, and therefore, had received standardized training; and second, they had implemented the program for a minimum of three years. For this study the teachers were divided into four cohorts. Each cohort was comprised of all the teachers who had been trained in a particular year (see Table 1).

Table 1 here.

Data Collection

Data were collected during the 1986/87 and 1987/88 school years using three instruments. The first instrument, the Whole Class Instrument, was used to observe students working in the classroom and focused on the groupings of students as they worked in the FO/D program. Five visits were made to each classroom and during each visit, two observations were taken. This resulted in a total of ten observations per classroom. The first observation was taken during the early part of the learning center activities.

The second observation was taken during the middle or later part of the learning center time. Because the Whole Class Instrument is sensitive to the time at which an observation is taken, taking two observations at different times at the learning center period helped to insure that the student activities recorded by observers were a representative sample of the range of possible student activities. To reduce the possibility of bias that student groupings and activities were influenced by the particular curriculum unit being implemented,

whenever possible, observational data for each classroom were collected across various units. Inter-observer reliability was measured by the percentage agreement based on a comparison of scoring by rater and supervisor. Reliability on the Whole Class Instrument was 93.5%.

The second instrument used was the Principal Questionnaire and it was used to collect data regarding the tasks completed by the principal at the school. The questionnaire was field-tested by several principals not involved in the study during the first year of data collection. Once revisions were made based on feedback, the questionnaire was mailed to principals in the study. Two versions of the questionnaire were used for two groups of principals: 1) those who had teachers using FO/D; and 2) those who had had teachers using FO/D but not when the study was being conducted. There were variations in the questions asked of each group of principals. Data were collected from as many principals as possible who once had teachers using FO/D but did not at the time of the study.

The third instrument, the Teacher Questionnaire, was used to gather data about the extent to which the teachers used the innovation and how many curriculum units they had completed. The questionnaire was field-tested using a small sample of teachers that had used the FO/D curriculum but were not a part of the study during the first year. Based on responses from the field-test, revisions were made to the questionnaire and it was mailed to the teachers. There were several versions of the questionnaire because it was necessary to phrase questions differently and/or to ask different questions, depending upon whether or not a teacher had continued to use the program or had stopped using the program.

Measurement

The independent variable, coordination, was an index of five indicators taken from the Principal Questionnaire. The items were designed to determine which tasks the principals carried out to help teachers implement the program. Principals were asked to indicate if they had: arranged for storage of supplies and materials; arranged for a classroom assistant; provided time for curriculum development; met with FO/D teachers to develop plans for the following year; and provided time for teachers to observe one another.

Measures of the two dependent variables, quality of continuation, and extent of program continuation, were taken from the Whole Class Instrument and the Teacher Questionnaire. The four measures for quality of continuation were taken from the Whole Class Instrument and focused on student activity occurring in the classroom. These measures were: the percentage of students talking/working together (Talk/Work); an index of classroom management (Management); differentiation of teaching materials (Differentiate); and a summary measure of implementation (Implement). The extent of program continuation was measured by the frequency with which the teacher used the program (Months, Days/Week) and how many curriculum units were covered by the teacher (Units). These three measures were taken from the Teacher Questionnaire.

Three control variables were used in this study: 1) grade level (Grade); 2) resources; and 3) first year implementation. Research by Lotan (1985) indicated that the number of curriculum units a teacher completed was related strongly to grade level. The hands-on science and math program requires many manipulative materials, thus, the level of resources available to the teacher had the potential to affect the number of curriculum units taught.

First year implementation was used to control for variation in first year implementation of the program.

Initial Results

Rate of Continuation

In this section, data are presented regarding the overall state of continuation of the FO/D program. These data provide the context within which the hypotheses are tested. Table 2 shows the status of teachers who were trained to use the FO/D program three years after their training. Data are presented for the overall sample as well as by cohort.

Table 2 here

Three years after training, 32 out of 61 teachers, or 52 percent were implementing FO/D. Nineteen teachers, or 31 percent, had stopped using the program. Of the original 61 teachers, data were not available on ten teachers.

Of the seventeen teachers in Cohort I, 59 percent, or ten teachers continued to use FO/D. Four teachers, or 24 percent, did not continue. Data were not available on three teachers. Three of the four teachers who stopped using the program were transferred to administrative programs, while one teacher was transferred to a middle school.

In Cohort II with eleven teachers, one teacher (9%) continued to use FO/D three years after training. Seven teachers (64%) had stopped, and three teachers could not be located. Examples of why teachers stopped using FO/D include: because it was too demanding, one teacher didn't like the program, and another teacher became a part-time administrator.

Of the nineteen teachers in Cohort III, thirteen teachers, or 68 percent, continued to use the program. Three teachers, or 16 percent, had stopped, and data were not available for two teachers. The teachers who stopped using FO/D did so because of changes in their assignments.

In Cohort IV, eight out of fourteen teachers, or 57 percent, continued to use FO/D, while five teachers, or 36 percent, had stopped. Data were not available on two teachers. Most of the teachers in this cohort who stopped using FO/D did so because they were transferred to grade levels or schools not using FO/D.

The two most common reasons teachers cited for continuing to use FO/D were that the program worked for students and the students liked the program. For example, one teacher stated, "...of all my training, FO/D put all the pieces together...it really works and I get excited watching the kids learn."

Quality of Program Continuation

The quality of implementation observed in classrooms in 1986/87 and 1987/88 reflected a variable number of years of training. For example, of the 21 teachers for whom there was classroom observational data, seventeen were observed in their third year after training; one teacher was in her fourth year of implementation; and three teachers were observed in their fifth year of implementation.

Classroom observational data were collected on 21 of the 32 teachers who were classified as "Continuing." Classroom data on the entire "Continue" sample were not collected for several reasons. First, some of these teachers who were classified as continuers in their third year were no longer implementing the program when they were contacted. For instance, several

teachers who had trained five years earlier reported they were using FO/D three years after training, but were not using the program during the time data were being collected. In those cases, it was not possible to obtain classroom data. Second, several teachers verified that they were implementing the program in their third year but did not allow access to their classrooms. In another instance, one teacher granted access to her classroom but stopped using the program mid-way through data collection.

In 1987, the Program for Complex Instruction developed quality control standards by which to judge the quality of program implementation. To develop the criteria, past sets of data were examined in which various measures from the Whole Class Instrument were related to each other and to achievement gains. For example, by examining the relationship between percentage of students talking/working together to gains on standardized achievement tests, it was possible to determine the point at which achievement gains began to diminish when talking and working together diminished. From this analysis, the following criteria were developed. The criteria made it possible to assess the degree to which implementation problems existed (Cohen and Lotan, 1987).

QUALITY CONTROL STANDARDS

Less than 30 percent of students talking and working together. Analysis of past data showed that when less than 30 percent of students in a classroom were talking and working together, learning gains on standardized tests began to diminish.

More than 6 percent of students disengaged. When two categories of disengaged behavior were combined into one overall category of disengagement, management problems became obvious to outside observers when six percent or more of the students were disengaged.

More than 12 percent of students in transition or waiting for teacher. This percentage in either of these categories by themselves is not potentially problematic. When added together, and also when combined with percentage of students disengaged, high percentages of students in these categories indicate problems with classroom management and teacher delegation of authority that interfere with students talking/working together.

The percentages for the quality control standards are based on repeated classroom observations for each classroom while students are at learning centers. Table 3 shows a comparison of the classrooms in this study to the quality control standards.

Table 3 here.

For the category "Talk/Work", only one classroom in the sample fell below the quality control standard of less than 30 percent, while 20 teachers were above the standard. In the "Disengaged" category, seven classroom had a greater percentage of disengagement than the quality control standard, indicating that one-third of the classrooms had a high percentage of classroom management problems in comparison to FO/D classes observed in the past. Note, however, that four of these seven classes were within the six to seven percent range, which equals approximately two out of 30 students. Overall, fourteen classrooms, or two-thirds of the classrooms had percentages below the quality control standards on one of the criteria, percentage "Disengaged", and one classroom fell below the standards on two criteria, "Talk/Work" and "Disengaged".

All classrooms in this sample met the quality control standard for percentage of students "Waiting for an Adult" and percentage of students "In Transition", indicating that these categories were not problematic in these classrooms. In other words, they did not have large percentages of their students waiting for the teacher or in transition.

Extent of Program Continuation

During the first year of implementation, program developers encouraged teachers to use the following pattern: start using FO/D in October at the latest; implement the program four days a week; and continue using the program through June of the following year. The only break that teachers should take would be between a few days to a week, to prepare materials for the next unit. By implementing the program between eight to nine months, four days a week, the teacher could cover almost all of the FO/D units in the curriculum. Additionally, it was important that students be exposed on a regular basis to the new form of instruction that used small groups and open-ended tasks, as well as cooperative group norms and roles.

In this sample of 32 teachers who continued to use the program, the average number of months teachers implemented FO/D was between four and five months. Only nine teachers implemented the program between eight and nine months. On average, the teachers used the program one to two days per week. Of the seventeen available FO/D units, the average number of units completed was between four and seven units. These data are summarized in Table 4.

Table 4 here.

Testing the Hypotheses

In this study, tests of the hypotheses were conducted at the teacher/classroom level. The first hypothesis predicted a positive relationship between principal coordination of the program and the quality of program continuation, with the exception of coordination and classroom management. That relationship was predicted to be negative. Table 5 shows the correlation coefficients for principal coordination and each of the indicators of quality of continuation (Dahl, forthcoming).

Table 5 here.

As the findings indicate, there was a weak positive relationship between coordination and percentage of students talking and working together, r=.17; and a weak negative relationship between coordination and classroom management, r=-.17. There was a weak negative relationship between coordination and differentiation, r=-.23; and no relationship existed between coordination and implementation, r=.07.

In a second analysis of the relationship between coordination and the quality of continuation measures, first year implementation was controlled. For the indicators Talk/Work and implementation, first year talk was controlled, while for the indicator classroom management, first year classroom management was controlled. It was not necessary to control for early implementation with the indicator of differentiation. Table 6 shows the results of the partial correlation, controlling for first year implementation.

Table 6 here.

Controlling for first year implementation strengthened the relationship between coordination and Talk/Work to r=.30, not significant. There was still a weak negative relationship between coordination and classroom management, r=-.20, and the relationship between coordination and implementation strengthened to r=.26, not significant.

A positive relationship was also predicted between coordination and the extent to which the program continued. Table 7 shows the correlation coefficients for coordination and the indicators for the extent of continuation.

Table 7 here.

A weak positive relationship was found between coordination and the number of months per year that FO/D was used, r=.19. There was a positive relationship between coordination and the number of days per week FO/D was used, r=.27. The relationship between coordination and the number of FO/D units completed also was positive at r=.29.

In a further analysis of the number of FO/D units completed, grade level was controlled for in a partial correlation. The partial r was .39, $p < .05$, using a one-tailed test of significance. Because the number of FO/D units implemented was potentially influenced by the availability of resources, both grade level and resources were controlled for in a regression analysis. Table 8 shows the results of this analysis.

Table 8 here.

The results show that the relationship between coordination and the number of FO/D units completed, r=.33 was statistically significant at $p < .05$, using a one-tailed test of significance. The full regression model was statistically significant at $p < .001$.

Interpretation of Findings

Coordination and the Quality of Program Continuation

The initial prediction of a positive relationship between coordination and the quality of program continuation was based on the rationale that if the principal organized conditions in the school that enabled teachers to implement a new and complex program, then the quality of what occurred in the classroom would be maintained over time.

One explanation for the lack of association between coordination and the quality of program continuation could be that once teachers had a strong understanding of the program, the principal's role changed or became less important to what happened in the classroom. The teachers in this sample, for example, demonstrated a strong grasp of delegation of authority, as measured by the high average percentage of students talking/working together in their classrooms. Given that level of understanding, it is difficult to see how principal coordination could go on affecting the quality of instruction in the classroom over time (Dahl, forthcoming).

Another explanation for the findings could be that teachers' concerns during the first year of implementation differ from their concerns in their third year and beyond. Thus, even though Parchment (forthcoming) found that principal coordination was related to implementation in the first year, teachers

may require a different type of support from the principal in their subsequent years of implementation. For example, while some types of coordination may be required initially, such as arranging for a special classroom for implementation and then developing a schedule to coordinate its use, arrangements for both the room and schedule would probably be maintained over time by the teachers, unless the principal radically changed those organizational arrangements. Thus, just as program implementation and continuation can be conceptualized as different stages in the educational change process (Fullan, 1982), each stage in the change process requires a different type of support from the principal. This interpretation suggests the need for a more detailed look at not only the tasks required of the principal in support of teachers' efforts, but at the changing nature of that support over time (Dahl, forthcoming).

On the one hand, these findings present an encouraging picture of teachers who made a commitment to a program they felt worked for their students, and who continued to use the program in the face of only a modest level of principal coordination. The findings are encouraging because they suggest that teachers will continue to use the program in spite of the level of organizational support they receive. On the other hand, these findings show that many teachers are left to their own devices when their efforts to implement a difficult program could be supported. These findings show support for the type of school described by Meyer and Rowan (1977) where little effort is expended to coordinate the technology of the organization.

Coordination and the Extent of Program Continuation

The results indicate that when principals coordinated numerous aspects of the program, the extent to which teachers implemented the program was greater than when principals did not perform those tasks. In other words, principals who performed those tasks shaped the teachers' work environment in a favorable way, making it easier for teachers to use more FO/D units during the school year (Dahl, forthcoming).

Discussion

The findings in this study raise questions about the role of the principal in support of teachers who implement a complex instructional program over time. The lack of association between the quality of continuation and coordination also leads to the question of what effect the principal has on the quality of instruction. Despite much of the discussion in education about the importance of the principal as an instructional leader, the data in this study show that principal's efforts at coordination do not have an effect on the quality of instruction. As stated earlier, the principal's role may differ with regard to program continuation versus initial implementation. It is possible that teachers who are familiar with a program may not require as much coordination by the principal, or they may require a different type of support than what was examined in this study.

What is the principal's role regarding program continuation? To answer that question, it is useful to think of the principal's role in two stages. In the first stage, the principal coordinates factors at the school that are designed to create the proper organizational conditions for continued implementation. The

findings showed that coordination was related to how many FO/D units teachers used. In other words, the principal helped to set the stage for continued program use. In the second stage, and once proper conditions for program use have been established, the principal then can focus on factors that might influence program quality. When conceptualizing the principal's role in stages, it is clear that setting the conditions for program use is a very different task than attempting to influence the quality of the program. The findings in this study indicate that both stages of support are necessary if the quality of programs is to be maintained or improved over time (Dahl, forthcoming).

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Table 1 Cohorts of Finding Out/Descubrimiento Teachers By Year of Training

Cohort	Number of Teachers	Year Trained	Third Year of Implementation
I	17	1982/83	1984/85
II	11	1983/84	1985/86
III	19	1984/85	1986/87
IV	14	1985/86	1987/88

Table 2 Status of Teachers Trained to Use Finding Out Descubrimiento by the Program for Complex Instruction: Three Years After Training 1982-85

Cohort	Year Trained	N	Continue	Not Continued	Not Located
I	1982/83	17	10	4	3
II	1983/84	11	1	7	3
III	1984/85	19	13	3	2
IV	1985/86	14	8	5	2
	TOTALS	61	32	19	10

Table 3 Comparison of Teachers in This Study to Quality Control Standards for Program Implementation

N=21

Class	% Talk/Work	% Disengaged	% Wait and In Transition
01	61.1	3.1	1.9
03	45.9	2.4	1.6
05	65.5	3.3	0.0
06	52.7	1.2	2.0
07	41.7	0.6	0.5
08	44.0	*7.8	2.5
09	48.8	1.7	7.2
10	47.6	0.5	8.6
11	48.8	2.8	8.2
12	59.5	3.1	5.3
13	50.2	1.8	7.4
14	37.2	*11.7	3.8
32	35.1	*9.3	4.4
35	38.3	5.6	3.9
36	45.4	4.5	0.0
37	+28.5	*11.1	7.5
38	50.5	1.6	4.3
39	31.6	*6.1	3.7
41	42.2	2.2	1.1
44	38.3	*6.5	5.3
45	52.1	*6.0	2.0
Quality Control Standards	< 30%	> 6%	> 12% both categories

* Percentage exceeds quality control standards.
+ Percentage fell below quality control standards.

Table 4 Extent of Program Continuation

Months	8-9	6-7	4-5	2-3	1
#Teachers	9	11	3	3	3
Days/Week	Every Day		3-4	1-2	
#Teachers	3		18	7	
Units	16+	11-15	8-10	4-7	<3
#Teachers	1	4	8	13	3

Table 5 Pearson Correlations of Coordination and Quality of Continuation

N=20

	Coordinate
Talk/Work	0.17
Management	-0.17
Differentiate	-0.23
Implement	0.07

Table 6 Partial Correlations of Coordination and Quality of Continuation, Controlling for First Year Implementation

N=19

	Coordinate
Talk/Work	0.30
Management	-0.20
Implement	0.26

Table 7 Pearson Correlations for Coordination and Extent of Program Continuation

	Coordinate	N
Months	0.19	26
Days/Weeks	0.27	26
Units	0.29	25

Table 8 Regression Analysis of Coordination and Number of FO/D Units Completed, Controlling for Grade Level and Adequacy of Resources

Dep Var: Units N: 23
Multiple R: .73 Square Multiple R: .53
Adjusted Squared Multiple R: .45
Standard Error of Estimate: 0.62

Variable	Std Coef	Std Error	T	P 1 Tail
Constant	0.00	0.77	-0.46	0.33
Coordinate	0.33	0.09	1.98	0.03
Grade	0.46	0.08	2.67	0.01
Resources	0.23	0.20	1.31	0.10

Analysis of Variance

Source	Sum-of-Squares	DF	Mean-Square	F-Ratio	P
Regression	8.01	3	2.68	7.03	0.00
Residual	7.21	19	0.38		